MARINE REVIEW.

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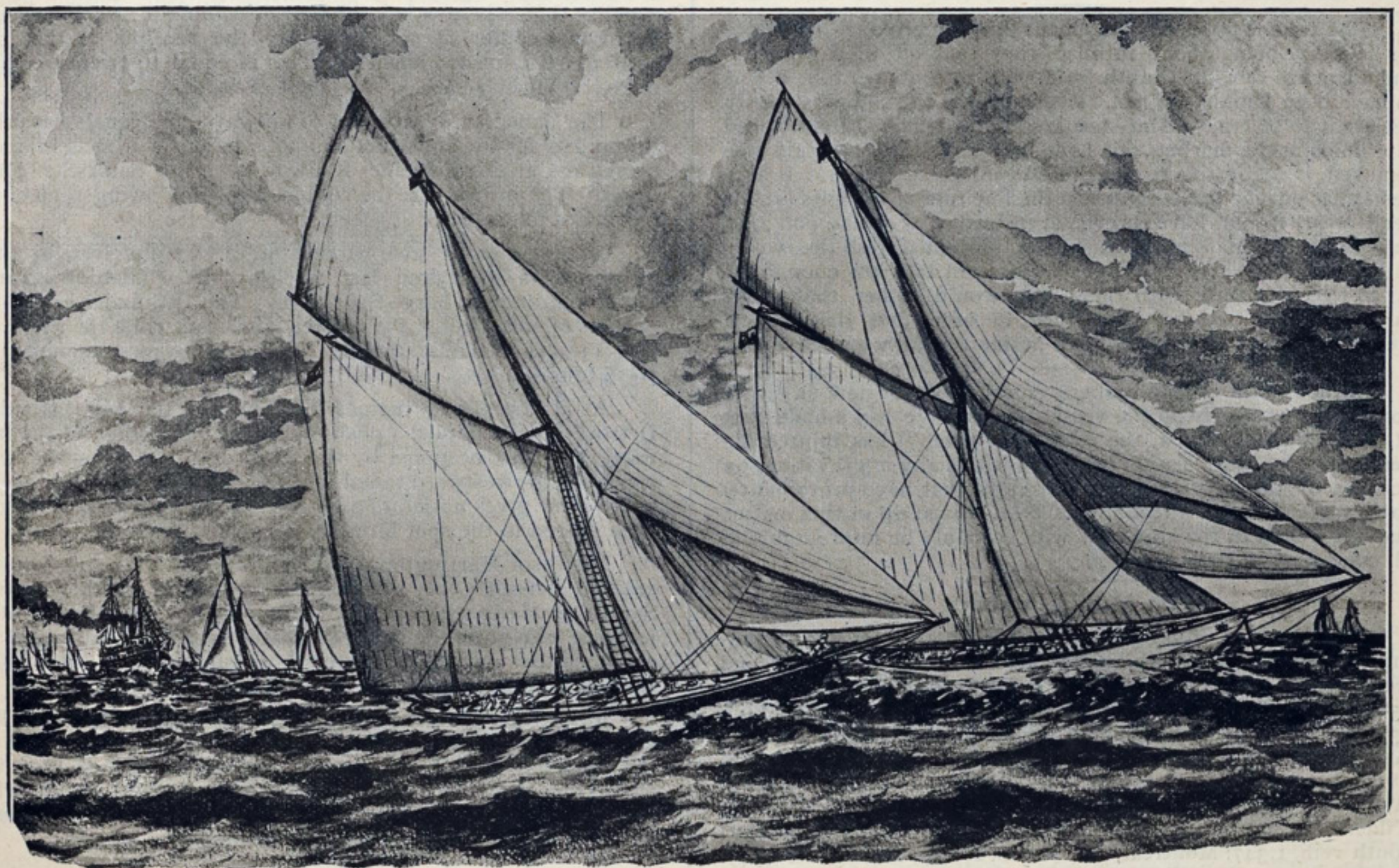
The International Yacht Races.

Although the third of the races for the America's cup, Wednesday, was not allowed because it was not completed within the six-hour time limit, the way in which the Vigilant left the Valkyrie seven minutes behind, notwithstanding a start under adverse circumstances, as good as settles the matter of the Vigilant's victory in three straight races. Capt. Cranfield of the Valkyrie said after the race Wednesday: "I am satisfied that we were beaten because the Vigilant is a better boat than the Valkyrie. If we had a chance of winning a race at all it would have been today." The particulars of the courses and time have been detailed in the daily papers but the dimensions of the challenger and defender, shown in the illustration, are not generally known. The Valkyrie is a cutter with a length of 85 feet 6 inches on the load water line, 20.6 feet beam and 16.6 feet deep. The Vigilant is a sloop with a center board, is 86.12 feet on load water line, 26 feet beam and 14 feet deep.

The cup was brought here by the America in 1851, and held against the Cambria, Livonia, Atlanta, Countess of Dufferin, Genesta, Galatea and Thistle, and this race seems to settle the matter of its staying here until the English condescend to imitate the Yankee and build a center board boat. The best time made over the 20-mile course in recent years was by the Volunteer, Sept. 27, 1887, four hours, fifty-three minutes and eighteen seconds.



VIGILANT AND VALKYRIE.

Lake Freight Matters.

Within the past few days the grain movement out of Duluth and Chicago has relaxed somewhat, and as a result the upward tendency in lake freights has been checked to the extent of a fractional reduction in grain rates and a falling off in the demand for ore vessels at $1 from the head of Lake Superior. It is admitted that the grain movement will not give employment to the entire lake fleet, and but for the movement of ore from the Missabe range, the requirements of ore shippers generally would render little assistance in sustaining the freight market. Ore companies shipping from Escanaba and Marquette claim that any ore which they have to come down is practically provided for in full, but demands from other quarters, together with the grain shipments, will it is thought, be sufficient to ward off any great slump in the market. On one block of 10,000 tons of ore to be shipped from the head of Lake Superior during the balance of the season, the shipper was unable to obtain a rate below 95 cents, and most owners refused to consider anything less than $1. It is the general opinion that the present rates will hold fairly steady until the close of the season without any prospect of high figures.

Several vessels now being constructed in England for the sole conveyance of cargo and live stock in the Atlantic trade will be very much larger than the big twin-screw ships already engaged in this service. One of these, the Cevic, launched a fortnight ago from the yard of Harland & Wolff, Belfast, is by far the largest cargo steamer in the world. This boat is fitted with two sets of triple expansion engines and is of the following dimensions: Length, 500 feet; breadth, 60 feet; depth, 38 feet; estimated registered tonnage, 8,315 gross, 5,335 net; total capacity of holds, 14,089 tons.

Tips from the Man on the Dock.

I have been thinking for some time of referring to the practice of vessel brokers making contracts with shippers that often result greatly to the disadvantage of the vessel interests. Various items have recently appeared in the papers hinting that some of the vessel broker firms of Cleveland have been speculating in coal freights, having contracted early in the season for the shipment of large blocks of coal, ostensibly for their own vessels, but much of which coal was subsequently dumped on outside vessels at a rate of freight lower than the contract rate, the brokers pocketing the margin on what the vessels carried, as well as exacting regular commissions from them for giving them "their best care." There is no question, of course, of the legal right to contract for the delivery of coal in this way and to charter vessels for it at the market rate, but this "market rate," if what is hinted is true, was a rate brought about through "bear" influence with certain shippers and was not the result of the legitimate operation of supply and demand. Brokers, therefore, who are paid by the vessel owner to sustain freights and to do their utmost for the interest of the craft entrusted to their care, can not safely become shippers as well, and thereby become interested in low freights, without causing widespread demoralization in the freight market. In such cases brokers are the worst enemies, or should be, of the clientage they have been paid to serve.

The recent published statement that the brokers' contracts for delivery being about fulfilled, they took off their pressure, and advanced rates to Duluth from 25 to 30 cents per ton, seems to have been founded on fact. Even some of the shippers openly declare it to be true. The steadiness with which the advanced rate holds in the market, since the brokers' "bear" pressure was removed, is suggestive to every intelligent vessel owner. It suggests that but for these contracts the low rate of 40 cents (at the very least) would have prevailed instead of 25 cents, and that thousands of dollars have thus been purloined from the vessel interests. The shippers believe the 40-cent rate low enough, so far as I have talked with them, and would rather that a fair uniform rate should be maintained, in order that the basis of freight on future sales of coal can be more readily agreed upon.

Although the evil of brokers' contracts is not new, in either coal or ore, as nearly all the vessel agents have had a hand in it at some time in the past, the extent to which it has injured the vessel interests this season has been especially aggravating, on account of the very low rates of freight that have prevailed on coal cargoes. Quite a feeling has been stirred up in this matter and the result in the long run will certainly be unprofitable to all concerned in such contracts.

Iron Mining Matters.

Shipments of iron ore from Two Harbors up to and including Wednesday, Oct. 4th, aggregated 762,299 gross tons and were divided as follows: Chandler, 371,141 tons; Minnesota, 317,758; Zenith, 12,998; Cincinnati, 9,939; Canton, 24,412; Franklin. 23,876; Hale, 2,176. Shipments of Gogebic range mines through Ashland up to and including Saturday, Sept. 30, foot up 981,859 tons, divided among the different mines as follows: Ashland, 27,760 tons; Aurora, 146,536; Colby No. 2, 45,615; Tilden, 114,171; Germania, 4,975; Iron Belt, 17,625; Montreal, south vein, 1,347; Montreal, north vein, 27,235; Eureka, A, 1,949; Brotherton, 14,643; Comet, 5,035; Eureka, 24,166; Careys, 44,214; Newport, 93,679; Norrie, 217,522; East Norrie, 69,214; Palms, 1,984; Pabst, 89,890; Jack Pot, 1,651; Davis, 13,282; Sunday Lake, 19,344.

Stephen W. Dorsey, at one time a senator and millionaire, is reported to be unable to meet a judgment of $400 against him in Denver. Only a few years ago when John E. Burton and the firm of Moore & Benjamin were cutting a great figure on the Gogebic iron range, "Steve" Dorsey was classed among the iron kings.

Andrew Carnegie, Henry Phipps and H. C. Frick of Carnegie steel works fame, visited the Vermillion and Missabe ranges last week in company with H. H. Porter, J. C. Morse, J. L. Greatsinger, and other officers of the Minnesota Iron Company and Illinois Steel Company. The trip is reported to have had no special significance. Mr. Carnegie and his associates were in attendance at the fair in Chicago, and accepted an invitation from Mr. Porter to visit the mining districts in Minnesota.

Around the Lakes.

Shipments of hard coal from Buffalo last week aggregated 67,980 tons.

Whitefish point 24-foot red spar buoy has gone adrift but will be replaced as soon as possible.

Capt. B. B. Inman of Duluth has purchased of the Smith-Fer company their three tugs—A. C. Adams, Pathfinder and Edward Fiske—and is again in control of towing business at the head of the lakes.

It is again reported that the Richelieu & Ontario Navigation Company of Montreal will build two more twin-screw, steel steamers for its upper St. Lawrence and Lake Ontario business, but there is no intimation as to when they will be built.

S. 18° W., 1¾ miles from Eleven-Foot shoal and S. 68° W., 1¾ miles from Corona shoal are the official directions given regarding the location of Eleven-Foot shoal light-ship, Green Bay. The boat is anchored in about 60 feet of water.

Capt. J. F. Smallman, sixty years of age and one of the oldest vessel masters on Lake Michigan, died at his home in Grand Haven, Tuesday. He became suddenly ill while taking his steamer, the City of Milwaukee, to Chicago on Saturday night previous.

Probably no port in the world ever handled grain with the rapidity that it is now being handled in Buffalo. During twenty-four hours ending at noon Tuesday the receipts at that port aggregated 1,600,000 bushels. This is equal to twenty cargoes of 80,000 bushels each.

The Canadian department of railways and canals has called for tenders for the construction and erection of a steel bridge to carry the Canadian Pacific Railway over the Sault Ste. Marie canal. The bridge is to be composed of one swing span of 250 feet and a fixed span of 75 feet.

The most grain ever carried out of Chicago river by a tow of two boats was taken last week by the whaleback steamer Pathfinder and the barge Sagamore. The Pathfinder had 98,850 bushels of corn and 25,250 bushels of wheat, while the Sagamore had 130,331 bushels of corn. The two cargoes amounted to 7,576 tons.

As at first placed, the new light-ship at Bar point, mouth of Detroit river, occupied a position somewhat farther to the eastward than that occupied by the old vessel, and when the wind was from the westward tailed into the channel. The light-house board now gives notice of a change, however, the boat having been moved to the spot formerly occupied by the old vessel.

Professor Harrington, chief of the weather bureau, announces that hereafter the official in charge of the weather office at Sault Ste. Marie will forward, twice a day, to observers at other leading lake ports the depth of water over the mitre sill at the canal, so that owners or masters interested in such information can get it at all times at the lake offices of the service.

Measurements of two lake boats, the tugs Conneaut of Buffalo and Harvey Watson of Grand Haven, were passed upon by the commissioner of navigation last week. The Conneaut is 62.29 tons gross and 31.15 net and is numbered 127,000, while the Watson is 27.74 tons gross and 21.98 net and will be known on the books of the treasury department as No. 96,249.

Inventions of a Marine Nature.

Specially reported from the patent office Washington, D. C., for the MARINE REVIEW

505,102—Signalling apparatus, by Wm. H. Hall of Chicago, Ill.; filed Jan. 3, 1893.

505,176—Mast for dredgers, by Wm. B. Pless of Stockton, Cal.; filed June 9, 1893.

505,361—Ships recording compass, by John Hope of Liverpool, Eng.; filed Dec. 2, 1892.

505,402—Screw propeller, by Alexander D. Hall of San Francisco, Cal.; filed April 4, 1893.

Copies of specifications accompanying these patents can be had at 15 cents each on application to THE MARINE REVIEW, 516 Perry-Payne building, Cleveland, O.

Two Modern Methods of Introducing Feed Water into Marine Boilers.

[*From the Iron Age, New York.*]

That the marine boiler should require a greater degree of care in its general management than the land or stationary boiler may not, at first glance, appear to be reasonable, nor is it contended that such precautionary measures as may be considered best for the former are not also well adapted to the latter; but it is a well-known fact that the land boiler, by reason of its greater accessibility, more advantageous situation, ampler heating surfaces and freedom from over forcing, is in a great measure relieved from those excessive strains and destructive influences which are constantly affecting the boilers of a steamship. Besides this, on shore it is not difficult to provide large and efficient outside feed water heaters, all needed room being availab'e, while in the hold of a steamer this is less readily done. Of necessity the marine boiler is more cramped in its quarters or allotted space, and in its proportion of heating surface, so that in order to preserve it for a rational "life time" there can be no relaxation of watchfulness nor any preservative method neglected. Since the adoption of forced draft, whereby such an increase of power has been obtained, the temperature in furnaces and tubes has risen greatly, and many casualties have occurred and many boilers been practically destroyed or rendered unfit for their designed purpose just by attempting to produce this increased power without any additional precautions being taken in management against the injurious effects of allowing cold air to rush in open furnace doors or feed water being badly directed or of too low a temperature.

The old conditions of having comparatively cool water in the bottoms of the boilers while that of the upper portion is boiling can no longer be allowed to exist without imperiling the structure through the stress brought by the unequal expansion of the parts, and it is to the proper and best method of introducing this feed water (be it hot or cool) that much attention is now being given by all steam users and more especially by those engaged in marine work, for even the hottest feed water may be introduced so as to fail in its best point—that of aiding in producing a good circulation. This feature has been too frequently overlooked by those who have adopted the use of feed water heaters and thought that included all the needed precautions, but it is as much an element of life to the boiler, or even more so, than sending the feed in hot, for where by reason of bad or faulty design a good natural circulation does not exist, that portion of the heating surface which properly should be most efficient is deprived of the close and constant supply of water and soon becomes burnt and leaky, or even dangerous. Many ruined crown sheets and tube ends owe their failure to this defect rather than to high furnace temperature or cold feed.

It behooves, therefore, every user of steam boilers, either ashore or afloat, to satisfy himself that he is not injuring his boilers nor wasting his costly coal pile through a defective feed system and faulty circulation, and while a good natural circulation is almost impossible to provide for in multitubular boilers, an effective artificial one is not difficult to arrange. He must keep in mind that simply deflecting the feed downward by an internal bend is not effective, for while it does provide against the direct impingement of cool water upon very hot surfaces, it at the same time sends the cool water to that part of the boiler already cooler than the rest and fails to help matters. This faulty practice existed until only recently with very prominent builders and designers, but has been summarily dropped except by those too careless of principles. Too much can not be said in favor of the feed water heaters, the benefit and profit accruing from their use being far reaching and great, but these are often difficult to apply to a large plant in close quarters, and the two devices here illustrated embody heating features as well as circulating ones and are well worthy of careful study, especially as to principle. Any one can modify and apply these points to their boiler feed pipe, according to need, and few boilers would fail to be improved by it.

Figs. 1 and 2 show the most recent arrangement of internal pipes for feeding marine boilers, and are equally applicable where outside heaters are or are not used. The general idea of each is to induce a transfer of water from the top to the bottom, or vice versa, by the current of the entering feed, to have the induced stream mix with the feed while still in the pipe, and to distribute the thus heated water uniformly and at various points through small branches whose aggregate area slightly exceeds that of the main. In that shown in Fig. 1, the entering water is directed upward through an injector nozzle, A, Fig. 3, which is contained within the pipe, and as the stream rushes upward it induces another stream through the connecting pipe C, which takes its water from the very bottom of the boiler by a perforated branch running longitudinally there. This induced stream mingles with the feed and is carried up over the tops of the tubes, through the hottest water, and is delivered by the small branches B B B downward between the tube nests. This is a forced circulation which is obviously excellent and has been successfully adopted by one of the largest ship building firms in the country, who originated it.

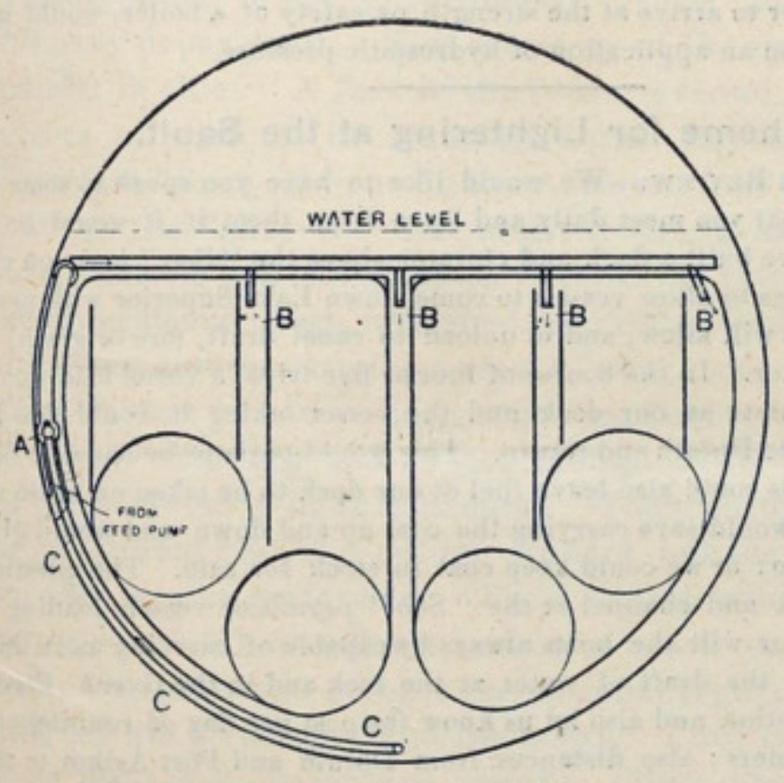


Fig 1.—Section of Marine Boiler.

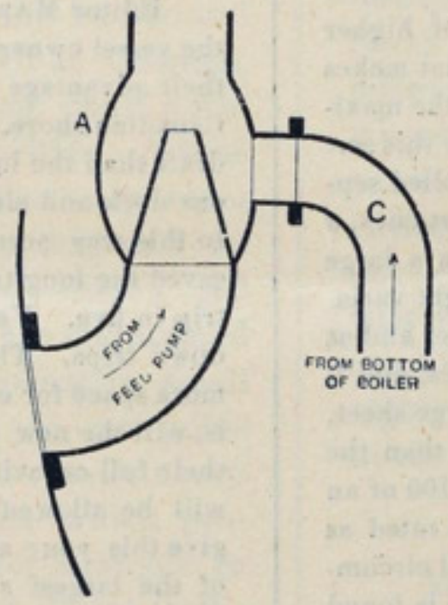


Fig. 3.—Injector.

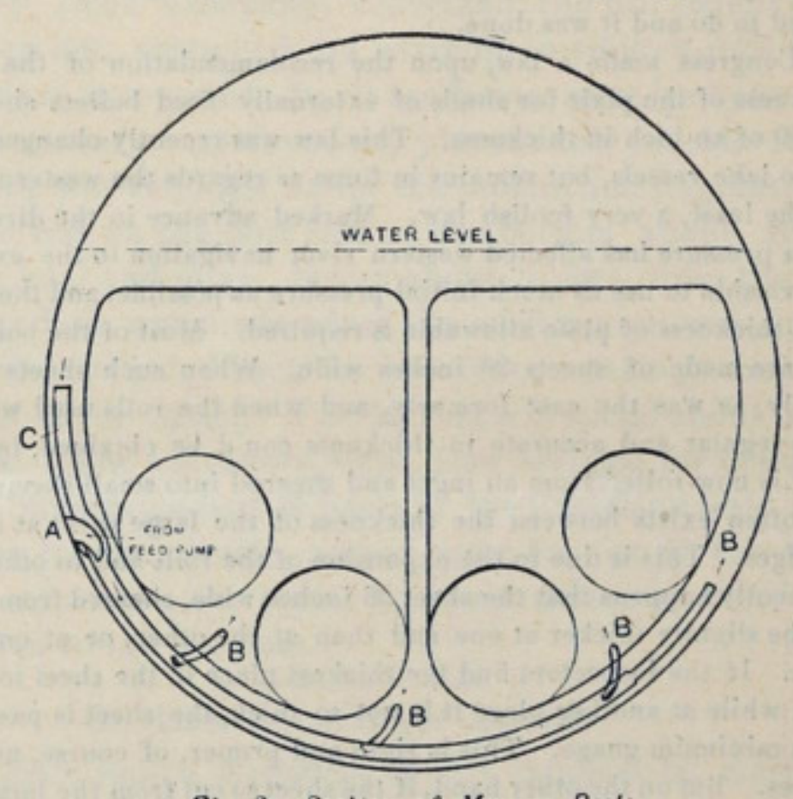


Fig. 2.—Section of Marine Boiler.

The next device, Fig. 2, is probably even a better plan, and is just the reverse of the first in its operation. The feed here is directed downward by a similar nozzle, and the induced current is drawn from the hottest water nearer the top. This mingled feed is thus greatly heated and is delivered at the bottom of the boiler through small branches directed backward and upward toward the back tube sheets, the most important point to have well supplied with water. The latter plan is somewhat on the principle of the circulator used on the French cruiser Forbin, though much simpler. There a small metal valved pump was attached to each boiler solely to draw water out from about the level of the top of the furnaces and deliver it into the very bottom, thus positively preventing the settlement of a body of cooler water there and proving extremely successful as a circulator and preserver of heating surfaces. When it is realized what an enormous quantity of feed water is required by a single one of the larger marine boilers it is not difficult to understand the effectiveness of the stream, if properly directed, as a circulator and the importance attached to the operation. For instance, one modern eight furnace boiler (double ended) with usual size grates will, under forced draft, require about twenty tons of feed water per hour.

Steamboat Inspection Service of the United States.

CONTINUED FROM LAST WEEK.

[*By John M. Sweeney, of Harvey, Ill.*]

Early navigators on western rivers recognized the necessity of having signals to be exchanged by passing boats. Prior to the introduction of steam whistles, these signa's were made by a bell, and the ru'e between navigators, recognized by all, was that the ascend ng boat should make choice of side on which to pass. To pass to the right, one sound of the bell was made, and to the left, two sounds. This same signal was afterwards, and continues since to be, made on the steam whistles. The navigators of these waters thought it proper and right that the ascending boat should have choice of sides, but it was a'so a part of their rules that the ascending boat should preserve the channel, that is, that the ascending boat must get out of the way of the descending boat to whichever side the ascending boat preferred, or so indicated to the descending boat—I am out of your way to the right or I am out of your way to the left, as the case might be. The ascending boat was the better judge of the position in which she wished to be, on account of being nearest to the point at which the meeting would occur; but there was, however, a further condition, that the descending boat might have the right to alter the choice made by the ascending boat, if the alteration was accepted by a proper exchange of signa's. After the board of supervising inspectors was created, the signals formerly used were formulated into rules of the board and became laws, and so continued until July 1, 1880, when the whole order of things was reversed and the descending boat was given first choice. This legislation was the most cruel of any that had gone into effect and resulted in no end of collisions, misunderstandings and alterations of signals. At an early meeting of the board, the pilots, masters and owners protested and asked that the old ru'e be restored. This the board concluded to do and it was done.

Congress made a law, upon the recommendation of the board, that the thickness of the plate for shells of externally fired boilers should not exceed 26-100 of an inch in thickness. This law was recently changed so as not to apply to lake vessels, but remains in force as regards the western rivers. It is, to say the least, a very foolish law. Marked advance in the direction of higher steam pressure has affected western river navigation to the extent that makes it advisable to use as much initial pressure as possible, and therefore the maximum thickness of plate allowable is required. Most of the boilers for this service are made of sheets 26 inches wide. When such sheets were rolled separately, as was the case formerly, and when the rolls used were short ones, a plate regular and accurate in thickness cou'd be obtained, but when a large sheet is now rolled from an ingot and sheared into small sheets, a slight variation often exists between the thickness of the large sheet at its center and at its edges. This is due to the expansion of the rolls and to other causes, and it frequently happens that the sheet 26 inches wide, sheared from the large sheet, will be slightly thicker at one end than at the other, or at one edge than the other. If the inspectors find the thickest place in the sheet to be 26-100 of an inch, while at another place it is not so thick, the sheet is passed but rated as of its minimum guage. This is right and proper, of course, under all circumstances. But on the other hand, if the sheet so cut from the large plate is found to guage 26-100 of an inch minimum thickness in one place, while on the opposite edge or end, or in the center, it guages an infinitesimal part of an inch more than 26-100, it is condemned by the inspector and can not be used in the boiler. This is an absurdity. It would seem that Congressional action was as much to blame for this blunder as is the board of supervising inspectors, and it would seem also that the next worst thing to the rules of the board, made without proper consideration, is an act by Congress, which, however erroneous it may be, is allowed to stand without correction.

More space might be devoted to criticism of this kind, but it will be sufficient to conclude with a slight reference to the results of the meeting of the inspectors in January, 1892. Within the last year or two there has been adopted for use on the western waters an arrangement for manhole openings in boiler heads, which consists of turning a flange around the opening, projecting the flange into the boiler, said flange being some two inches wide, and the manhole seating against the inner edge of the flange. This was a superior arrangement, as it strengthened the head of the boiler and was much safer in every way than the former construction. At the meeting just referred to, the board practically annulled the use of this construction, by passing the following rule: "When holes exceeding 6 inches in diameter are cut in boilers for pipe connections, man and hand-hole plates, such holes shall be reinforced with wrought iron or steel rings of equal area to the material cut from said boilers." When appealed to in this matter, the board's reply was that the law could be complied with by shrinking a band on the outside of the flange turned around the opening—a useless effort which would not add one unit of strength to the construction, but which would, on the contrary, tend to weaken at once the flange and the head by compression, since the resultant force of the band would determine to push the flat surface outward from the boiler, which is precisely the effort within the boiler to be resisted.

At this same meeting the following rules were adopted: "On all copper steam pipes over 5 inches in diameter the flanges shall be of bronze or brass composition, securely braized or soldered and fastened in addition with rivets to the pipe. On lap-welded iron or steel pipes the flanges may be made of boiler plate of either iron or steel, when securely attached to steam pipe by rivets, and in no case will the use of cast iron or cast steel flanges be allowed for such pipes." A perusal of this rule will at once show how impossible it would be to comply with such a law, since it would require all flanges on iron pipes to be riveted, even should the pipe be but 1 inch or less in diameter; and again there is incongruity in the rule that having a steam pipe 5 inches in diameter, bronze flanges must be attached both by riveting and braizing, while if the pipe is but 4⅞ inches in diameter the flange needs only braizing. This rule was so peculiar that the board as a body, or through supervising inspectors, or in some other way, annulled it by issuing a circular which held that the rule was not intended to apply to pipe excepting those over 5 inches in diameter, and since the issuance of this circular such a construction has been placed upon the rule by the local inspectors.

There is a method which the board of supervising inspectors might adopt with great satisfaction to themselves and with beneficial results generally. Instead of endorsing new rules as they are introduced, and thereby putting them immediately into effect as law, they should defer final action in all such cases until the next meeting of the board. In the meantime the proposed rules could be laid before the owners, builders and others in interest, for consideration. It is hardly to be hoped that any such method would meet with the approval of the inspectors, but an act of Congress requiring such a proceeding would balance up, to some extent, the mistakes of that legislative body here referred to. The reasons advanced for rules that are applicable to seaboard and lake navigation can not always be applied to navigation on western rivers, and the results of such rules are often very different. If indeed we must have inspectors at all, it would be more productive of good service could there be a separate board having charge of legislation affecting the class of craft considered in this paper. A separate board, it might be hoped, would create a service which, in order to arrive at the strength or safety of a boiler, would not depend so fully upon an application of hydrostatic pressure.

A Scheme for Lightering at the Sault.

Editor MARINE REVIEW:—We would like to have you speak to some of the vessel owners that you meet daily and learn from them if it would be to their advantage if we built a dock and elevator above the "Soo" locks on the Canadian shore, so as to allow vessels to come down Lake Superior with more draft than the locks will allow, and to unload to canal draft, (ore or grain) at our dock and elevator. In the course of four or five trips, a vessel load would in this way accumulate at our dock and the vessel taking it would thus be saved the long trip to Duluth and return. This would perhaps be equal to one trip in five. Vessels could also leave fuel at our dock to be taken on again on down trips. This would save carrying the coal up and down, and would give more space for cargo; or we could keep coal in stock for sale. The question is, will the new lock and channel at the "Soo" permit of vessels loading to their full capacity, or will the boats always be capable of carrying more than will be allowed by the draft of water at the lock and in the river? Please give this your attention and also let us know the cost per day of running one of the largest steamers; also distances from Duluth and Port Arthur to the "Soo" and to Buffalo. T. M. KIRKWOOD.

Sudbury, Ont., Oct. 5, 1893.

It is not probable that any vessel owner of experience in lake business would look with favor upon the lightering scheme outlined in the foregoing letter. The saving in water haul on Lake Superior is not of enough importance to warrant serious consideration of the proposition, especially in view of the delay and expense that would be incurred in breaking cargo at the Sault.

As regards the question of cost per day of running one of the largest lake steamers, the correspondent is referred to Vol. VI, No. 9 of the REVIEW, which contains a detailed statement of operating expenses and earnings of the Minnesota line steamer Manola.

The distance from Duluth to Sault Ste Marie is 397 miles and from Port Arthur to Sault Ste Marie 270 miles; from Duluth to Buffalo 997 miles and from Port Arthur to Buffalo 870 miles.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Oct. 7, 1893:

	Wheat, bu.	Corn, bu.
Chicago	19,239,000	3,327,000
Duluth	3,552,000	.....
Milwaukee	717,000	.....
Detroit	1,196,000	12,000
Toledo	1,685,000	187,000
Buffalo	1,499,000	376,000
Total	27,878,000	3,902,000

At the points named there is a net decrease for the week of 123,000 bushels of wheat and 720,000 bushels of corn.

Life Saving Service and Revenue Marine.

It is not generally known that the credit of creating the life saving service of this country, which is thought to be the finest in the world, belongs to Mr. S. I. Kimball, the present superintendent of the service. During Gen. Grant's administration, Mr. Kimball, who was then a chief clerk in the treasury department and had proven a very efficient officer, was selected to reform the revenue marine, which was created over 100 years ago by Alexander Hamilton, but which had grown into a political machine after the war. While engaged in this duty he was asked by a subordinate to approve a bill of $50—three months' salary for the keeper of a life boat on the New Jersey coast. This led him to inspect these stations, which were found in a very dilapidated state, the boats being missing from some of the shanties, and in one case it was found that the keeper lived twelve miles away but was paid $200 a year for keeping the key. Through Mr. Kimball's efforts an appropriation of $200,000 was secured and several first class stations built. Congressmen from the coast began to ask that stations be recommended for their districts, and an organized effort later on led to the establishment of the present institution, which is an important branch of the treasury department.

The revenue marine is another important adjunct in the treasury wing of the government. It has no connection with the navy department. The secretary of the treasury is its commander in chief. A fleet of thirty-six revenue cutters assist collectors of customs in securing duties imposed by the tariff. There are fifteen stations on the Atlantic, four on the Pacific and four on the lakes, the lake stations being located at Oswego, Erie, Detroit and Milwaukee. At all the principal coast ports boarding steamers are furnished the customs authorities. These thirty-six cutters require a crew of over 1,000 officers and men. The Alaskan service requires the best boat of the fleet and the Bear, 198 feet long and 18 feet draught is stationed there. All of the boats carry light armament. These cutters are maintained at an annual cost of a million dollars, but the expense is small for the service performed. They cruise about 300,000 miles every year. Their officers and men board 30,000 vessels every twelve months and enforce the national regulations which provide for life preservers and life boats. They collect $350,000 in fines and assist quaranhine officers. They prevent illegal traffic in rum and fire arms at Alaska, go to the rescue of ships in distress, aid the life saving service upon call and are, in brief, the policemen, firemen, tax gatherers and detectives along the coasts of two oceans and upon the lakes.

Favoring the Construction of Rams.

Lord Armstrong, the head of the great British ship building firm which constructed the ill-fated battleship Victoria, is of the opinion that the building of such immense war vessels is a mistake. At the annual meeting of the Armstrong and Mitchell Company, a few days ago, he said that the collision off Tripoli had taught a lesson that should be heeded. He advocated the building of several vessels especially designed for ramming, such as the United States ram Katahdin, now being built at the Bath Iron Works, Bath, Me., after the design of Admiral Ammen. These vessels, he said, should not be too large and should be kept free from the costly complications of battle ships. Personal dash on the part of the commander would be the principal quality needed in handling such a rammer. The occasional loss of such an inexpensive vessel would be of small importance as compared with the loss of a great battleship like the Victoria.

Novelty in Machinery of the New Gunboats.

In the new United States gunboats for which bids will be opened shortly the principle adopted for engine economy when working at low power will be the same as that inaugurated in the Maine. The low pressure cylinders are forward in the Maine and can be disconnected when working at low power, making the engines compound, the pressure corresponding accordingly. The engines of the gunboats are quadruple with 250 pounds steam pressure working at full power. For cruising purposes they will be triple expansion with steam at 160 pounds pressure. There are two sets of boilers, four tubulous, carrying 250 pounds, and two cylindrical, 160 pounds pressure, and here is where the novelty comes in. All these boilers can be utilized at full power. The coil boilers give their steam to the high pressure cylinders direct, but the cylindrical boilers deliver their steam to the first receiver. Here it meets the exhaust steam from the high pressure cylinders at 160 pounds. The cylindrical boilers with the triple expansion will answer for cruising, but the coils can also be used independently. The twin screws, each with its own engine, cylinders 11, 16, 24, and 30-inch stroke, will give 1,760 horse power at 300 revolutions, yielding 14 knots. Cruising speed would be 8 knots at 160 revolutions. The disconnection of the low pressure cylinders is by coupling fitted on the crank shaft between these cylinders.

A Break of 260 Feet.

With the removal of fractured material from the bottom of the steel steamer Merida, in dock at the yard of the Ship Owners' Dry Dock Company, Cleveland, the full extent of the injuries which she sustained by striking a sunken rock in the St. Mary's river, is revealed. In all 130 frames were broken or bent and it was necessary to remove forty plates, while considerable intercostal work was required under the boilers and engines. The break, which was on the port side of the bottom about midway between the keel and bilge, began about 40 feet from the stem, where a large hole was made when the obstruction was first encountered, and extended back for 260 feet, covering almost the entire length of the vessel. The Merida will spend about twenty days in dock. The surveyors, Capt. Dan McLeod for the underwriters and Superintendent Bristow of the Cleveland Ship Building Company for the owners, agreed upon $25,600 as the cost of repairs, but, of course, there may be some difference either way in the loss due to the accident.

St. Lawrence River Survey.

Mr. William Smith, Canadian deputy minister of marine, is doing all in his power to assist the war department of the United States in its efforts to make a continuous survey of the ship channel of the River St. Lawrence between Cape Vincent and Morristown, N. Y., by a method of sweeping. He notifies Canadian vessel owners that it is essential to the success of this enterprise that the apparatus should not be interfered with by passing vessels. Large vessels, especially paddle-wheel boats, are requested to run slowly when passing near the surveying outfit. "Canadian owners are reminded," says Mr. Smith, "that they are indebted to the government of the United States for the most accurate information with reference to the hydrography of the St. Lawrence river, and the United States authorities have on all occasions, been most courteous in furnishing them with charts and information, and that it is their own interests to assist the American government in making these charts yet more accurate."

Commander Brice will undoubtedly find some new shoal spots in the vicinity of Squaw island, Lake Michigan, where the Saxon struck a few days ago, if he gives the place a thorough investigation. The wooden steamers Roumania and Lansing had big repair bills to pay, on account of striking in this same locality, and an appropriation should be secured for a light-ship to be stationed somewhere near the shoals that are now marked only by a red stake.

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.
Chicago office, (branch), No. 706 Phoenix building.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,657 vessels, of1,183,582.55 gross tons register in the lake trade. The lakes have more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of steam vessels of 1,000 to 2,500 tons on the lakes on June 30, 1892, was 321 and their aggregate gross tonnage 534,490.27; in all other parts of the country the number of this class of vessels was,on the same date, 217 and their gross tonnage 321,784.6. The classification of the entire lake fleet is as follows:

Class.	Number.	Gross. Tonnage.
Steam vessels	1,631	763,063.32
Sailing vessels	1,226	319,617.61
Canal boats	731	75,580 50
Barges	69	25,321.12
Total	3,657	1,183,582.55

Tonnage built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
1891	204	111,856.45
1892	169	45,168.98
Total	1,038	473,723.60

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1892.	1891.	1890.	1892.	1891.	1890.
No. vessel passages	12,580	10,191	10,557	3,559	4,207	3,389
Ton'ge, net regist'd	10,647,203	8,400,685	8,454,435	7,712,028	8,698,777	6,890,014
Days of navigation	223	225	228	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IN reaching out for additions to the tax duplicate, the Cleveland board of equalization has found within its jurisdiction vessel property, owned by non-residents and valued at about half a million dollars, upon which taxes will be assessed. This board displays some judgment in not increasing still further the taxes of resident vessel owners and thus driving such owners to not only altering the home port of their vessels, but also changing their own place of residence, if forced to extremes in tax matters. But the non-resident owners will also find a means, especially if they control any of the vessels, of avoiding the payment of taxes in Cleveland in excess of what they would be compelled to pay elsewhere, and on this account the squeezing process is certain to result contrary to expectations. Vessel property is in most respects beyond the control of municipal or state authority, and lake cities that demand only reasonable taxes from vessel owners will profit by such a policy to the disadvantage of th ir more exacting neighbors.

AN indication of the increase in firms now engaged in naval work in this country is found in preparations for bids on the three new gunboats. Although the number of bids may be limited, the concerns interested will be numerous. Among those that have asked for information upon which to base proposals for different parts of the work are the following: Wm. Cramp & Sons Ship and Engine Building Company, Philadelphia, Pa.; Portland Company, Portland, Me.; Newport News Ship Building and Dry Dock Company, Newport News, Va.; Union Iron Works,San Francisco, Cal.; J. H. Dialogue &Co., Camden, N. J.; Coronado Foundry and Machine Company, San Diego, Cal.; Neafie & Levy, Philadelphia, Pa.; Fulton Engineering Company, San Francisco, Cal.; Maryland Steel Company and Charles Reeder & Son, Baltimore, Md.; G. B. Wendell, Detroit, Mich.; William Cowles, Brooklyn, N. Y.; Jonson Engineering and Foundry Company, New York, N. Y. Bids are to be opened Oct. 17.

Two cadets selected from the United States naval academy to take a course of steam engineering at some of the large ship building concerns in England must remain at home, because the concerns in question demanded a big premium for the instruction and the government has no appropriation for that purpose. The chances are ten to one that in any of the industries in which this country excels a courtesy of this kind would be granted without hesitancy. But this action on the part of Great Britain—it can hardly be considered a private affair on the part of her shipbuilders—will not deter the United States navy from getting the benefits derived from the training of these cadets. It will undoubtedly be paid for, as is the case with cadets sent to the Glasgow University for advanced schooling in naval architecture.

ADVOCATES of a foreign trade in American ships have reason to feel proud of advances made in that direction during the past two or three years, but British pre-eminence in the world's shipping must be acknowledged. In a publication issued recently by the Bureau Veritas of France the estimated value of the merchant fleet of Great Britain is $1,100 000,000. This represents more than one-third of the actual shipping of the world—14,971 out of 42,257 vessels. Six out of twelve of the largest steam and sailing companies in the world are British, and of the fourteen vessels of over 8,000 tons employed in the world's commerce, British ship-owners claim nine.

WOODEN vessels are fast disappearing from the navies of the world. There will soon be only five wooden ships left in the United States navy, and these will include Admiral Farragut's old flagship, the Hartford, and the Kea sage of Alabama fame, for both of which large appropriations have been made to practically rebuild them.

The schooner Charles B. Leet, barkentine Eliza J. McManemy, screw steamer Lizzie Henderson, half-brig Mary C. Mariner, three-masted schooner Nellie F. Sawyer and bark Pactolus, all American vessels, were classed last week by the American Shipmasters' Association of New York, publishers of the Record of American and Foreign Shipping.

Howard's ship yard at Jeffersonville, Ind., is a very large establishment to be under the exclusive control of one person. It was established over forty years ago by Capt. James Howard. The yard has turned out 555 river boats.

Capt. Alex. McDougall's Patents.*

APPARATUS FOR RAISING SAND—SPECIFICATION FORMING PART OF LETTERS PATENT NO. 469,841— DATED MARCH 1, 1892 —APPLICATION FILED MARCH 3, 1891—SERIAL NO. 383,563—NO MODEL.

This invention relates to an improved device for dredging the bottoms of rivers or harbors, or for removing sand, earth, &c, from positions under water, or for boring holes for piles and stakes under water. The inventor says:

"The principal object of my invention is to provide a device for the above purposes, which can be operated in any position under water and may be readily changed from one position to another, since the boring or disintegrating tool is flexibly connected to the source of power. Another object is to provide a device for the purposes explained, wherein the use of shafting or other mechanical means connecting the source of power with the boring tool is dispensed with. A still further object is to provide a device for the purposes just set out wherein the boring tool is so connected with the source of power that if a rock or other obstruction is encountered the boring tool will not be broken but will come to a rest, although the engine or other source of power will continue to operate. The principal novelties in the invention consist of a flexible or other pipe adapted to

*Under this heading we will publish specifications accompanying letters patent granted to Alexander McDougall, of West Superior, Wis., since his first application for a patent on the whaleback type of vessel, May 1, 1880.

be passed over the side of the dredging vessel, or to be lowered into position from a dock or other structure adjacent to the water; a metallic cylindrical casing at the lower end of said pipe; a worm or propeller or screw or analogous device within said cylindrical casing; a boring or disintegrating tool of any appropriate construction at the lower end of said casing and mechanically connected with said worm or cylinder device, and a pump or equivalent connected to the upper end of said pipe, all adapted to operate and co-act together as will be more fully described, and embodied in the claims.

"Fig. 1 is a side view of the invention, partly in section, showing the same in use in connection with a boat; Fig. 2, an enlarged sectional view of one form of boring tool showing a worm for operating the same; and Fig. 3, an enlarged sectional view of another form of boring tool, showing a propeller for operating the same. In Fig. 1. the device is illustrated as being operated from a vessel A, which may be of a suitable construction or design; but it should be understood that the device may be operated just as conveniently from a dock or other structure adjacent to the water or from a point any distance inland. B is the pipe before referred to, which is passed over the side of the vessel A, as shown in Fig. 1, so that its lower end will be near the place to be operated on. The pipe B is preferably a flexible

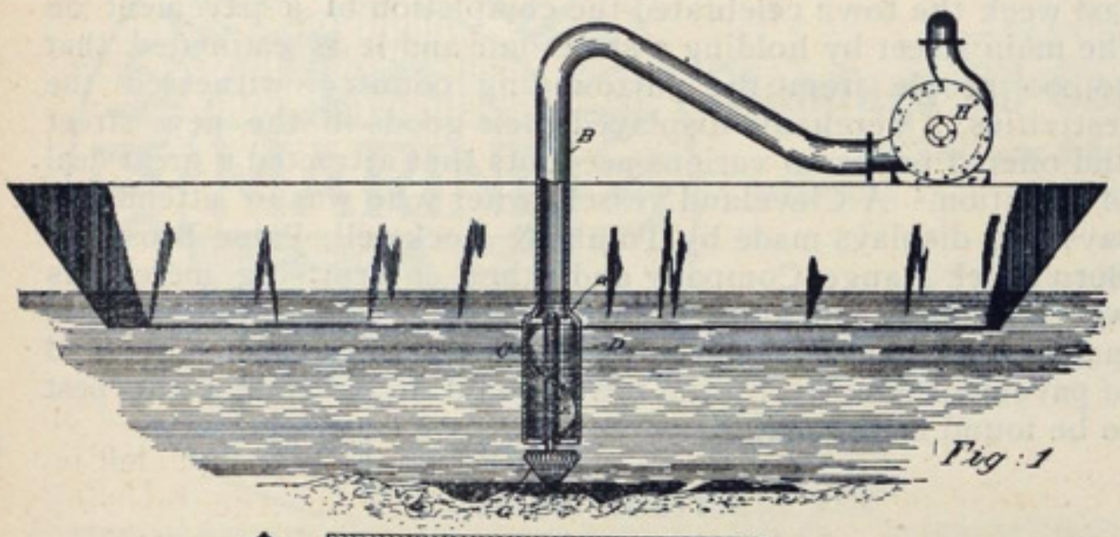


Fig. 1

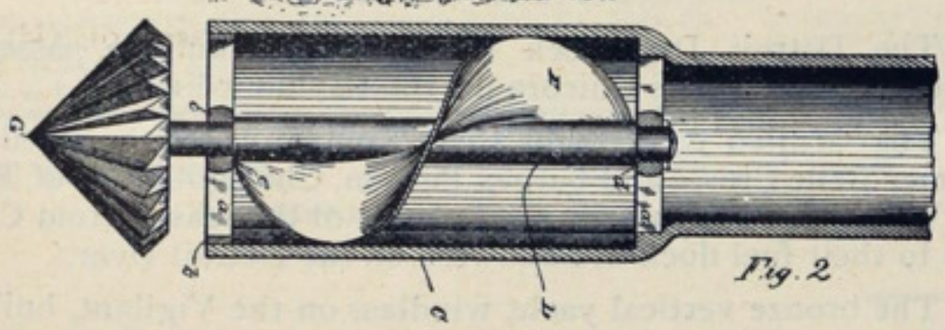


Fig. 2

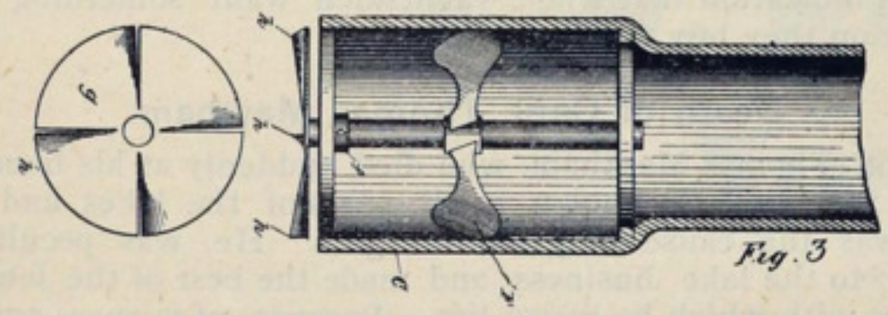


Fig. 3

pipe, made either of some yielding material—such as rubber or water-proof fabric—or it may be a metal pipe having suitable joints therein, so as to be flexible. It should be understood, however, that the pipe B may be a rigid pipe. C is a cylindrical casing made, preferably, of metal and rigidly secured to the lower end of the pipe B by any suitable means. This casing C is made somewhat larger than the pipe B, but as a portion of its interior is occupied by the worm or equivalent and the shaft therefor, the space within the casing C for the passage of the sand, earth, &c., is about the same as the pipe B. At the upper and lower portions of the casing are the spider arms *a a*, which are secured in position in any appropriate way, or instead, these spider arms may be made integral with the casing.

"In Fig. 2 the spider arm or arms at the lower portion of the casing are secured to a rim *b*, which is held in place by means of bolts or screws, so as to be removable. One or more spider arms may be used at the upper and lower ends of the casing, or the equivalents thereof may be substituted. At the central part of the spider arms *a a* is formed a bearing *c*, which may be of the same material as the spider arms, or instead, it may be of some anti-friction metal secured in place. D is a shaft vertically mounted within the bearings *c*, so as to be easily rotatable. This shaft is provided near its upper end with a shoulder *d*, which abuts against the upper bearings, and at its other end with a shoulder *e*, which rests upon the lower bearings, so that the shaft will be securely held from moving laterally. This construction, which is illustrated in Fig. 2, is applicable only when the lower or upper spider arms are removable. When the spider arms are made integral with the casing C, a removable collar *f* may be used instead of the shoulder *e* as shown in Fig. 3. Rigidly secured to the shaft D is a worm E of ordinary construction. When a slow motion of the boring tool is desired, this worm is made with a very slight pitch, and vice versa. The worm E fits snugly within the casing C. so that when the water and sand or earth passes up through the same the worm will be revolved either rapidly or slowly, according to its pitch.

"In Fig. 3 I have shown a propeller or screw wheel F secured to the shaft D instead of the worm E. The operation of this propeller F is the same as that of the worm, but it has the advantage of occupying less space than a worm, although the expense of a propeller or screw wheel would be greater than that of a worm. The pitch of the propeller or screw wheel may also be changed, so as to obtain different speed. Instead of either worm or propeller or screw wheel, other mechanical constructions may be substituted, and I would have it understood that it is the intent of this specification to include as equivalents thereof all constructions of devices which will be operated by the passage of the water and sand through the casing. At the lower end of the shaft D a boring tool G is rigidly secured. The form of boring tool shown in Fig. 2 is like a large-sized burr, the construction of which is well-known to mechanics. The form of boring tool shown in Fig. 3 is the form which I prefer to use, on account of its cheapness and effectiveness in operation. It consists simply of a circular plate of metal *g*, as shown in the lower view of Fig. 3. Cut out of this metal plate are depending lips *h*, which are preferably cut at an angle as shown, so as to form cutting edges. It will be evident that by means of this form of boring tool the sand, earth, &c., will be cut so as to pass directly into the mouth of the casing C, whereas in the construction of tool shown in Fig. 2 the material is thrown to one side and has to pass over the top of the burr into the mouth of the casing. The preferred form of boring tool will feed itself into the substance to be cut, which will not be the case with the construction illustrated in Fig. 2. Although I intend to embody this preferred form of boring tool in my claims, it must not be understood that I restrict myself to this particular form, for any kind of boring tool may be used in connection with the other elements of my improved device. At or near the upper end of the pipe B is a pump H, or its equivalent, which is used for pumping the water or sand or earth up through the casing and pipe. The preferable form of pump for this purpose is a centrifugal pump. The pump H is placed on the vessel A or the dock or other structure, or it may be placed any distance inland, and it is adapted to be operated by any suitable source of power.

"The operation of my device is as follows: The pipe B and casing C are lowered, so that the boring tool will rest on the substance to be removed. The pump H is now started and water will first be drawn up through the casing C and pipe B. As this water passes through the casing C, it will cause the worm or propeller to revolve, and the boring tool G will be rotated either fast or slow, according to the pitch of the worm or propeller. The boring tool will cut into and loosen the substance which will be drawn up through the casing and pipe by the suction, and the worm or propeller will therefore tend to work as long as there is material and water passing through the casing. After the water, with the sand or earth, leaves the pump H it may be disposed of in any ordinary way. In case the boring tool strikes a rock or other obstruction its motion will be arrested without breaking the same, and the rotation of the worm or propeller will cease, although a pressure will be brought thereon which will tend to turn the boring tool. This state of things will be observed at the pump by the presence of little or no sand or earth in the water, and the pipe B can then be raised and the boring tool allowed to operate at some other point. This device can be used in boring holes for piles, &c., under water by allowing the boring tool to operate vertically downward at the particular place desired, but in the boring of holes I prefer to force water down through the pipe B, so as to reverse the actions I have just described, and this feature is embodied in another application. What I claim as new is as follows: In a device for the purposes mentioned, the combination of a pipe, a casing C at the lower end of the same and of larger diameter than the pipe, a worm or equivalent within said casing, a boring tool connected with said worm or equivalent, and a pump or equivalent for creating a circulation of water within said pipe, substantially as set forth."

Proposed new form of Ocean Greyhound.

The London Engineering Review says: "A very remarkable system of ocean transport has been brought out in Paris by a French engineer, Monsieur Bazin, who was a fellow student of President Carnot, and is already well-known as the author of several useful engineering inventions, includidg the so-called Bazin dredge, which has been applied to works of magnitude both in England and in other countries. M. Bazin's proposal is to construct an Atlantic liner on eight rollers, and he claims to show, by the working of models and by algebraic formulæ, not only that his idea is practicable, but that it can be successfully applied to secure a greater speed in transatlantic navigation than any hitherto reached. Without adopting M. Bazin's ideas, or even endorsing their practicability, we have thought it worth while to call attention to them as embodying a new departure in methods of propulsion, of which we may in the future witness a more or less modified outcome in actual practice. The basis of M. Bazin's proposal is the theory that the eight wheels, or rouleurs, on which his vessel is fixed will so far diminish the resistance offered by the waves that a much greater speed may be developed, and he places the possible speed to be maintained on an Atlantic voyage at fully 30 knots an hour, which would enable the passage from Southampton or Liverpool to New York to be accomplished in a little over 100 hours. The rouleurs enter the water to the depth of 8 meters, and revolve slowly within a platform placed 7½ meters above the water, thus forming a rolling instead of a gliding body, as is the case with the ordinary system of propulsion. The rouleurs do not, however, actuate the screw propellers whereby the vessel is actually moved, special machinery being provided for this purpose. Mr. Bazin claims to have settled by experiments that the stability of the rouleur type of vessel is at least as great as that of the ordinary type, and believes that the construction of his design of ship will be much less costly than that of the usual description. It is proposed to put M. Bazin's plans to a practical test by constructing a vessel of 124 meters in length and 30 meters in breadth, with rouleurs 24 meters in diameter and 10 meters thickness, and they will be mounted on shafts 0.75 centimeters diameter. The rouleurs are estimated to make 22 revolutions per minute, and will, it is believed, easily achieve 57 kilometers, or 30 knots, an hour, with a force equal to 10,000 horses, of which 2,400 horse power is assigned to rotation and 7,600 to propulsion. One of the leading maritime concerns in France is stated to have taken up the project with much favor."

Lumber Matters.

Lumber shipments from Saginaw valley ports were fairly active during September, being somewhat in excess of August shipments, but very low as compared with previous years. Total shipments for September from the different ports on the river during the past three years are as follows:

	1891.	1892.	1893.
Lumber	56,580,000	39,219,000	20,143,190
Lath	2,450,000	2,500,000	650,000
Shingles	14,112,000	8,870,000	900,000

Alpena has shipped 75,334,000 feet of lumber, 8,729,000 shingles, 4,326,000 lath, 2,015,000 staves, 379,000 cedar railway ties and 247,000 cedar posts this season.

One Year's Business.

Since January 1, 1893, the American Ship Windlass Company, Providence, R. I., has furnished the following lake craft with Providence steam windlasses and capstans: Steamers W. P. Ketcham and Thomas Cranage and schooners Geo. B. Owen, H. A. Barr and Paisley, built by James Davidson, West Bay City, Mich.; steamer Interlaken, by A. Smith & Son, Algonac, Mich; steamers Manitou and Arthur Orr, Chicago Ship Building Company, South Chicago, Ill.; steamer Geo. J. Gould, Union Dry Dock Company, Buffalo, N. Y.; steamer Wotan, Alex. Anderson, Marine City, Mich.; steamer Mohawk, Detroit Dry Dock Company, Detroit, Mich.; passenger steamer Christopher Columbus and barges 129, 130, 132, 133 and 134, American Steel Barge Company, West Superior, Wis.; steamer Everett, Pacific Steel Barge Company, Everett, Wash.; steamers Yuma and Alva, Cleveland Ship Building Company, Cleveland, O.; steamers Centurion, S. S. Curry, Geo. Stone, L. R. Doty and Merida and schooners Yukon, Ed. McWilliams and Mary E. McLachlan, F. W. Wheeler & Co., West Bay City, Mich.

In addition to these, hand pump brake windlasses were furnished the steamer Chippewa, built by the Hamilton Tool and Bridge Company, Hamilton, Ont.; steam pump brake windlass for the tug Morse, L'Anse, Mich.; deck steam capstans for tug J. W. Bennett, Duluth, Minn., and two double-barrel capstans for use in F. W. Wheeler & Co's. ship yard. The company has orders for steam capstans and windlasses for the following boats: Steamer building for Curtis & Brainard by M. P. Lester, Marine City, Mich.; steamer building for the Mills Transportation Company, Algonac, Mich.; steamer Wolverine, building by R. W. Linn, Gibralter, Mich., and barge 135, being built by the American Steel Barge Company, West Superior, Wis. These machines must be giving satisfaction as these same builders have been buying them for years.

Progressive Lake Towns.

The steel works project at Ashtabula draws attention to that place as one of the many lake towns that have grown to a position of commercial importance within a few years, through connection with the lake trade. There has been nothing of a boom about Ashtabula's growth, and it is to be hoped that the steel works project, whether great or small, is genuine, as speculative schemes of any kind would result to the disadvantage of progress already made towards the building up of a city around the immense ore docks that have made the place famous. Only last week the town celebrated the completion of a pavement on the main street by holding a street fair and it is estimated that 10,000 people from the surrounding country witnessed the festivities. Merchants displayed their goods in the new street and offered prizes on various accounts that attracted a great deal of attention. A Cleveland vessel owner who was in attendance says that displays made by Tombs & Rockwell, Paine Bros., the Born Steel Range Company and other enterprising merchants were especially fine and the whole affair would do credit to many cities that lay claim to metropolitan methods. The kind of pavement adopted by the town is said to be among the best to be found in the state.

Trade Notes.

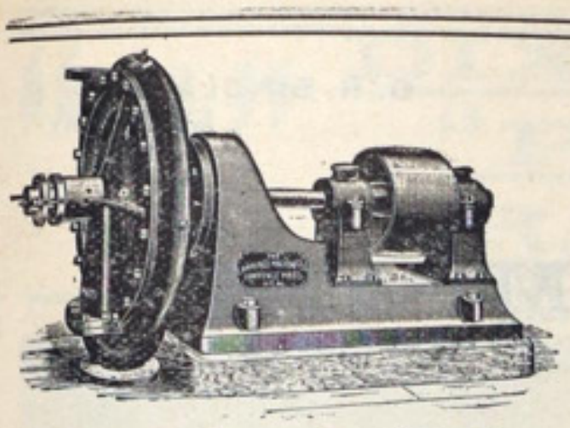
The Detroit Dry Dock Company will build a passenger steamer similar to the Chicora for the Seymour line.

The Mullen & Gatfield Coal Company has engaged the steamer Belle Crosse and barges Benson, Chicago Board of Trade and Waud to carry coal for the balance of the season from Cleveland to their fuel dock at Sandwich on the Detroit river.

The bronze vertical yacht windlass on the Vigilant, built by the Herreshoff Manufacturing Company, was manufactured and furnished by the American Ship Windlass Company, Providence, R. I., an indication that when yachtsmen want something they can rely on they buy the Providence.

Death of Capt. Thomas Maytham.

Capt. Thomas Maytham, who died suddenly at his home in Buffalo Sunday, was known in all parts of the lakes, and his death was the cause of general regret. He was peculiarly adapted to the lake business and made the best of the few advantages with which he began life. Because of fairness and integrity he had the confidence of his associates in business, and the regret expressed by everyone connected with lake commerce upon the announcement of his death was sincere in every way. Capt. Maytham was fifty-three years of age.



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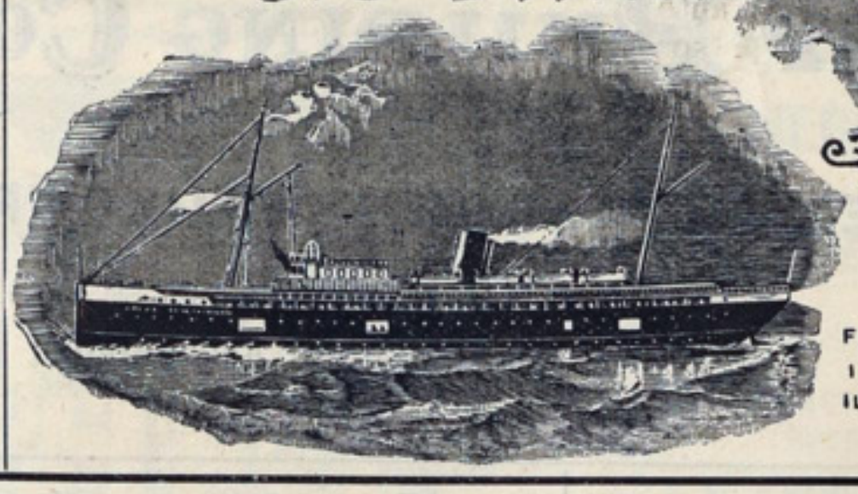

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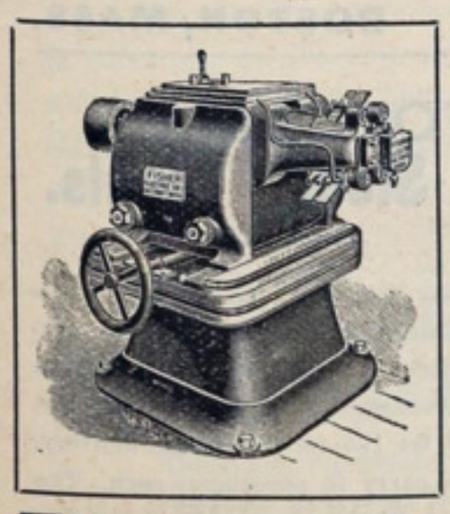

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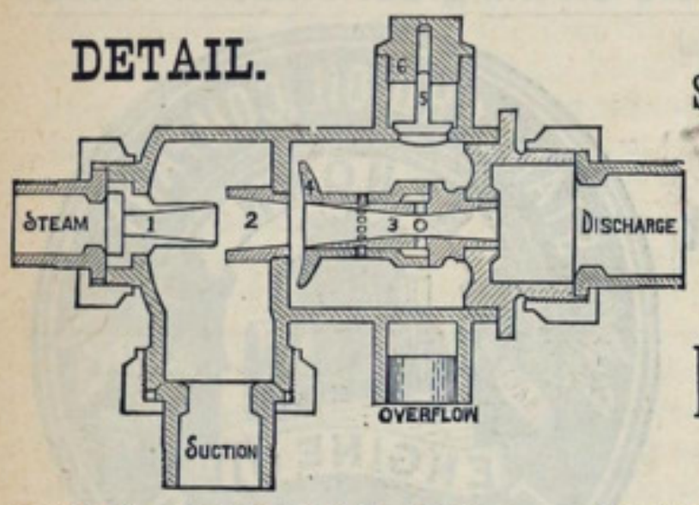

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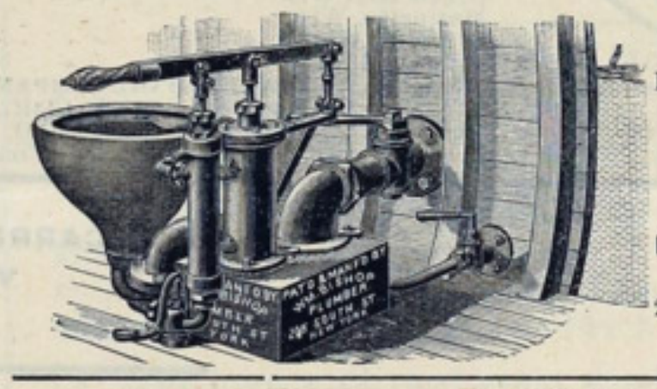

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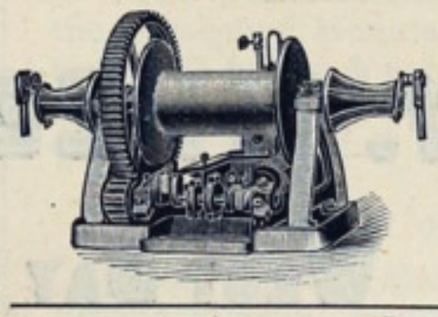

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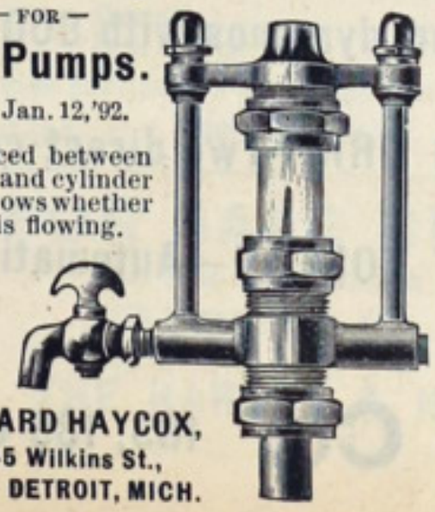

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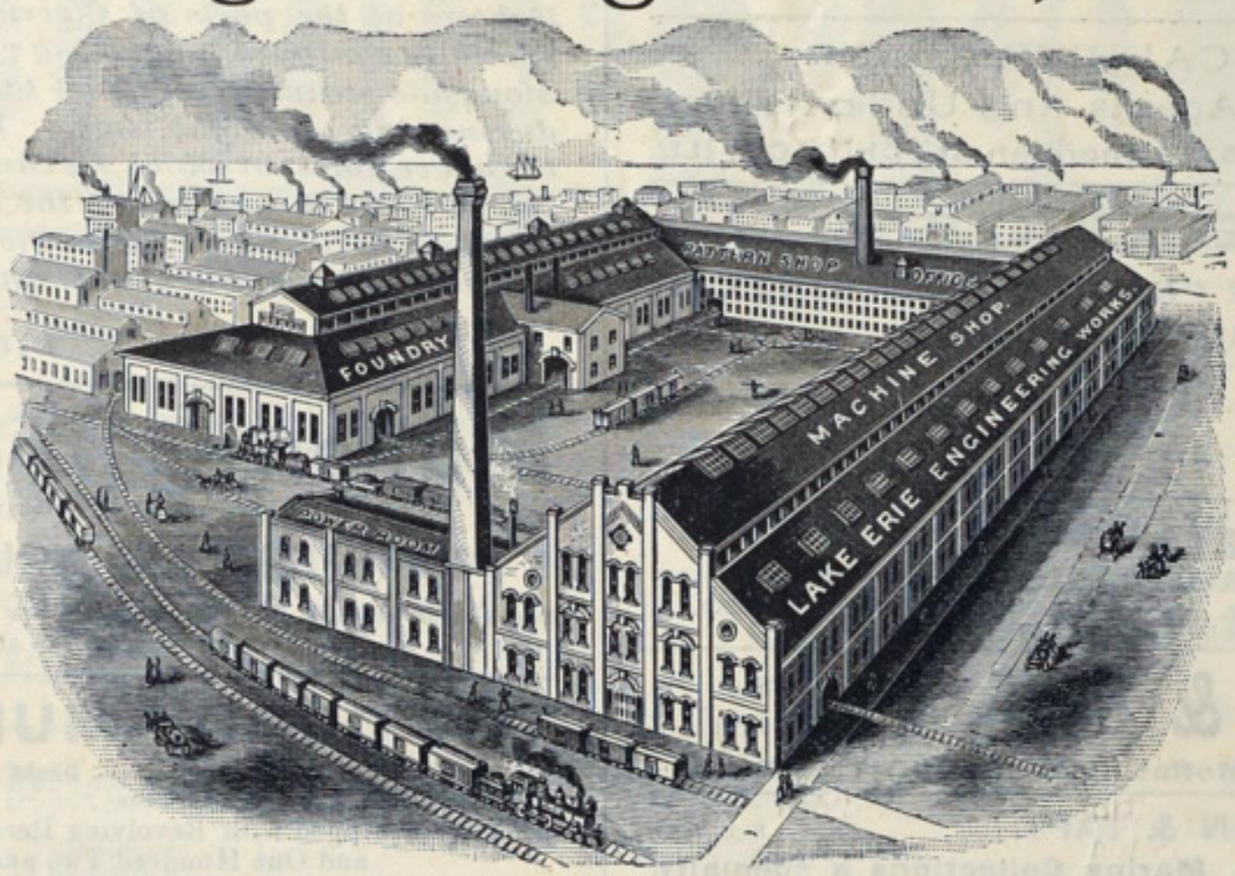

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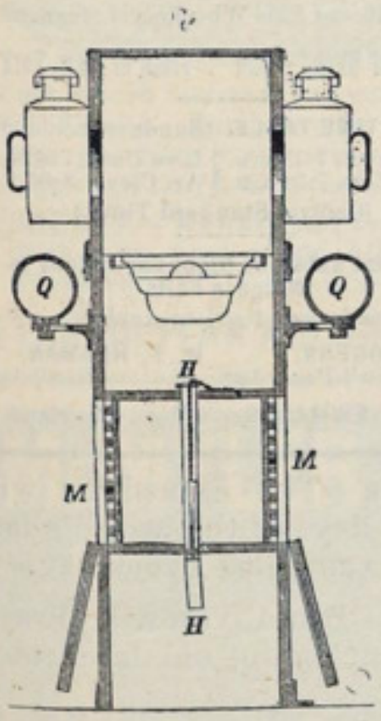

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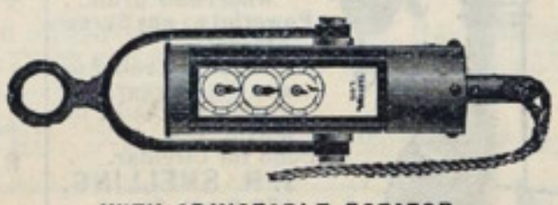

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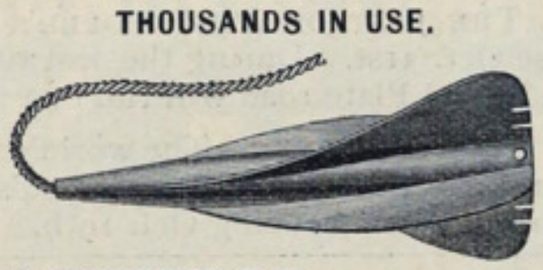

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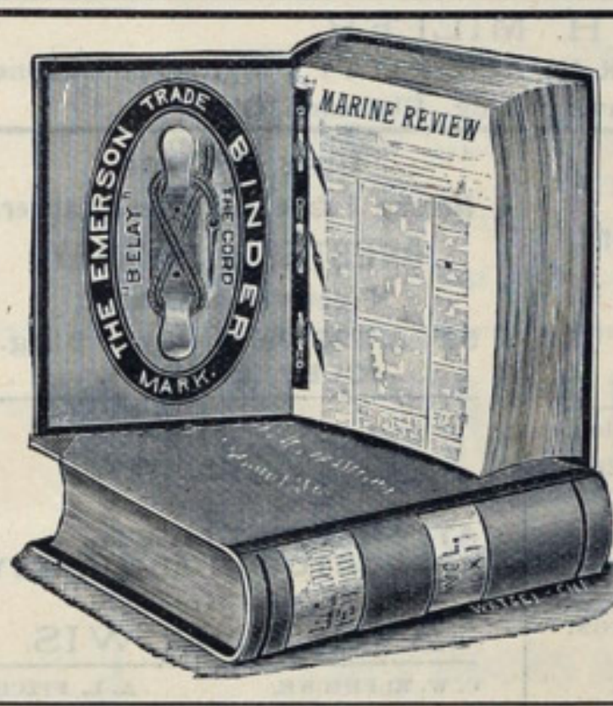

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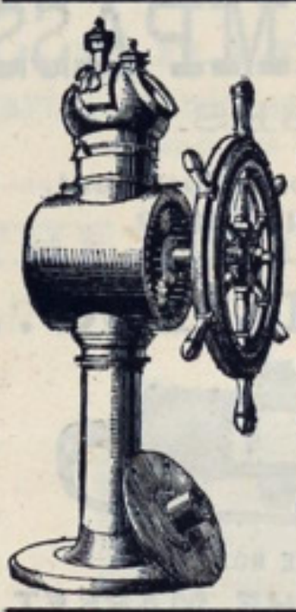

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